achromatic, magnifying 200 times, to make a considerable notch in the Sun's limb at $2^h\ 49^m\ 53^s$ apparent time, and at $2^h\ 54^m\ 55^s$ apparent time, I first was certain of light appearing between the limbs of the Sun and *Mercury*."

The mean of Maskelyne's observations would give a time $2^h\ 52^m\ 24^s$, which would be somewhat later than the ingress of *Mercury's* centre. Allowing 24^s for east longitude of Cambridge, this differs by 1^m from the record of St. John's College. The duration of the transit was $1^h\ 24^m$, remarkably long.

It should be noted at (‡) that the *Connaissance des Temps pour l'an* 1782 gives as the Equation of Time for the day $15^m\ 33^s$. This number of *seconds* is evidently required to make the sum of the first three times of the above record exactly equal to XII^h.

An account of the old Observatory of St. John's College, removed in 1859, will be found in the observations of the Rev. Thomas Catton, made between 1791 and 1826, and published in Vol. xxii. of the *Memoirs of the Royal Astronomical Society*, 1854.

Proposed devotion of an Observatory to observation of the phenomena of Jupiter's Satellites. By G. B. Airy, Astronomer Royal.

The position which the Royal Astronomical Society holds in the astronomical world may well justify it in employing its judgment and its influence in the direction of astronomical enterprises exterior to its own body. Guided by this consideration, I venture to submit to the Society whether they may not adopt, as an idea worthy of promulgation under their auspices, the proposal that one Observatory should be permanently devoted to the observation of the phenomena of *Jupiter's* satellites.

It is well known to the students of Gravitational Astronomy that the theory of the movements of *Jupiter's* satellites is a very singular one, perhaps the most interesting among the planetary applications of the theory of Gravitation. And the results are striking, especially in the remarkable enchainment which they exhibit in the movements of the three interior satellites, which at the same time are effected by the mass of the fourth. The fourth satellite has a claim peculiar to itself; it is on that satellite that observations must be made for determining the mass of *Jupiter* (the element which in the solar system is next in importance to the mass of the Sun). It is by it that the mass of *Jupiter* was determined originally (with some inaccuracy) by Pound, and subsequently in the first instance by myself (as is detailed in the *Memoirs* of this Society), and in the second instance by Bessel.

In late years the observations of the satellites have been

greatly neglected. The few observations that have been made of the third and fourth satellites are sufficient to show that the errors of their tables are too large to enable us practically to use these objects for even rude time-determinations, and at the same time are far too rarely determined to enable us to correct the elements of the tables. Of the first satellite there are, perhaps, sufficient observations, possibly also of the second satellite. But it must always be borne in mind that the tabular movements of the satellites cannot be corrected one by one; the necessary relation among their motions, to which I have already alluded, compels us to treat all together, and in combination with one of the most delicate theories of science.

The reason of the neglect to which I have alluded appears to be this, that the observations of such phenomena (occurring at what may be called irregular times, but times which are perfectly peremptory when the phenomena do occur) interfere most injuriously with the good order of the one class of observatories which has been strictly brought to rule, namely, the meridional observatories. And I see no prospect of obtaining a sufficient number of observations unless some observer would consent to give his entire observing energies to these observations. The accompanying observations for correction of clock would be of so light a character that I do not think them worthy of further notice.

It may be well to remark that, even to an observer who should determine to neglect no observation, a very fair amount of holiday would be left. Thus in 1872 there is no eclipse of satisfactory character visible at Greenwich between May 18 and September 18, and no other phenomena between June 9 and August 31. The interval between observations of less satisfactory character is from July 3 to August 29. In the winter oppositions of *Jupiter* the observations of satellites are rather pressing, for a time, but much less so in the summer oppositions.

The phenomena which first call for attention are undoubtedly the eclipses. Next to these, I am enabled to say on the authority of Laplace, are the transits of shadows upon the planet's disk, if they can be observed with sufficient accuracy. They possess this remarkable merit, that they are computed by the very same tables with which the eclipses are computed, without reference to the position of the Earth. Possibly the observation of transits of the satellites over the disk, and of occultations behind the disk, would be more accurate; they require, however, an additional calculation, depending on the position of the Earth. It would, however, be very desirable to examine all.

Having myself, in past years, repeatedly observed the phenomena of every class, and having at a more distant time studied the mechanical theory applicable to them, I may venture to express my belief that the mere observations, in their beauty and the incessant variation of their character, would be found very interesting; but that the highest interest would be felt on connecting them with their appropriate theory, and in making the

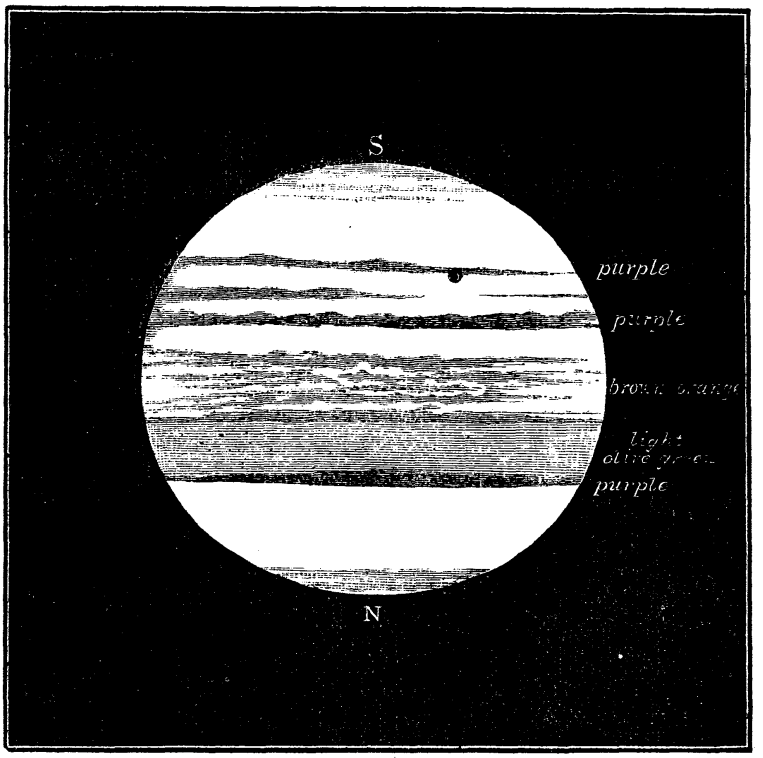
preparations for that numerical work by which each observation would be made to bear its part in the correction of elements and in the ultimate test of the theory.

Royal Observatory, Greenwich,
1871, *December* 26.

Remarks on the Planet Jupiter. By W. Lassell, Esq.

I send a sketch and a few remarks upon the planet *Jupiter*.

Now that the fourth satellite has begun again for a season to cross the planet's disk, I have looked out for opportunities of observing its transit, and was favoured on the night of the



30th Dec. last by witnessing a part of its passage over the disk under circumstances more than usually propitious.

On its first entrance it was scarcely to be distinguished from the limb, not appearing at all, as the others generally do, as a round, bright spot. As it advanced it grew gradually manifestly darker than the surface of the planet, and by the time it had advanced a fourth of the way across, it had become a very dark if not a *black* spot,—so dark indeed that if I had looked at